GEOLOGY OF CINCINNATI

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All Cincinnati parks contain rocks, but a visit to Ault Park will clearly reveal the geological features of the area. Either print out this two-page guide and use it on a trip to Ault Park, or simply read through this guide in order to learn about the rocks found in Cincinnati.

At the park, the well-marked Tree Trail begins from a service road located north of the Ault Park Pavilion. Walk a quarter-mile straight down the Tree Trail until you come to Ault Park Creek on the valley bottom. Do not cross the creek, but turn right onto the creekside trail that, in a couple hundred feet, will bring you to a bridge over a small brook.

While standing on the bridge, note the small waterfall in the channel of the brook below you. The lip of the waterfall is composed of a limestone layer that is supported underneath by softer, darker layers of shale. As water erodes the shale and carries it away, the unsupported limestone layer breaks off in blocks, causing the waterfall to migrate upstream.

Layers of limestone and shale together comprise the bedrock of the Cincinnati region. This bedrock, about 450 million years old, started out as layers of bottom sediment in a sea that covered the area during the Cincinnatian Epoch of the Ordovician Period. Since that time, the land of the region has risen and the sea has retreated. Hundreds of millions of years of weathering have removed the sediments that accumulated on the Cincinnati landscape following the Ordovician Period.

To continue the field trip, step back off of the bridge and walk downslope, taking the paths to the right until you descend to the brook. Upon reaching the brook, note that a large, reddish boulder is buried in the bottom of the channel, about fifteen feet above the brook's mouth on Ault Park Creek. This boulder is known as an erratic, since its mineral composition is markedly different from the surrounding limestone and shale pieces that are derived from the local bedrock. Ice Age glaciers carried erratics into Cincinnati from Labrador, Quebec and Ontario, as well as from northern and central Ohio.

The Ice Age (the Pleistocene Epoch of the Quaternary Period) began approximately two million years ago and lasted until about ten thousand years ago. In the Ice Age, continental ice sheets appeared during periods of global cooling. In each period an enormous amount of snow built up on northern North America as more snow fell in winter than melted in summer. The accumulating snow's tremendous weight compressed the snow into glacial ice, and then caused the glacial ice to spread outward at the ice sheet's margin. A continental ice sheet would retreat and finally disappear as warmer global temperatures returned.

A glacier covered all of Cincinnati about a million years ago. A second glacier covered the eastern half of Cincinnati, including Ault Park, about a quarter million years ago. (A third glacier, the one reconstructed in the Cincinnati Museum Center's exhibit on the Ice Age, reached into Cincinnati's northern neighborhoods about 20,000 years ago). Based on measurements of the current Greenland ice sheets, the Ice Age's continental glaciers probably were nearly a mile in thickness. As they ground south toward Cincinnati, the glaciers scraped rock off the landscapes over which they moved. The rock fragments came to be deposited here as the glaciers receded due to melting and the rock debris (erratics) carried by the ice settled onto the ground.

To see more evidence of Cincinnati's glacial past, return to the Tree Trail and cross Ault Park Creek in order to reach the graveled Valley Trail. Turn right and follow the Valley Trail down the valley. At the signpost, turn left off of the Valley Trail and climb up the connecting path in order to reach the Ridge Trail.

From the connecting path, turn left onto the Ridge Trail. Walk up the Ridge Trail about 40 feet until you see a piece of natural concrete (known as conglomerate) embedded in the middle of the trail. In order to see more conglomerate, walk another 60 feet up the Ridge Trail and then take the short trail to the right. Here a large amount of conglomerate is located at the ridgeline, surrounded by exposed tree roots.

This glacial feature originated a quarter million years ago when a glacial meltwater stream deposited stone and gravel at this location. Over the next several thousand years, water draining through nearby, glacier-crushed limestone debris picked up calcium carbonate (lime) and spread it as cement in this glacial outwash deposit. The resulting cemented rock sediment, known as conglomerate, has slowly been exposed as the surrounding streams have cut their valleys into the local landscape.

To return to your vehicle, retrace your steps down the Ridge Trail, up the Valley Trail, and up the Tree Trail. The species of trees, shrubs and herbaceous vegetation along these trails indicate that the soil in Cincinnati is neutral, that is, neither acidic nor alkaline. Its lack of acidity is due to the buffering effect of the calcium carbonate (lime) derived from the glacier-crushed limestone debris. The neutral soil's lack of alkalinity is due to the fact that much of the alkaline calcium carbonate has been washed (leached) away by stormwater percolating through the soil since the retreat of the last glacier.